

**Claims**

I claim:

1        1. A method of generating a differential image of an object  
2        in a light scattering medium, comprising the steps of:

3            illuminating a portion of said light scattering medium  
4        with a single burst of illuminating light to generate  
5        reflected light therefrom;

6            providing a charge generating photosensitive device in  
7        the path of said reflected light;

8            activating said charge generating photosensitive device  
9        for a period of time during which a portion of said reflected  
10       light is collected by said charge generating photosensitive  
11       device in the form of a generated charge that is indicative  
12       of an image each instant of time during said period of time;

13           providing a first charge storing device and a second  
14       charge storing device, each of which is independently  
15       operatively coupled to said charge generating photosensitive  
16       device;

17           storing, on said first charge storing device, said  
18       generated charge present on said charge generating  
19       photosensitive device during a first part of said period of  
20       time wherein a first image is defined;

21           storing, on said second charge storing device, said  
22       generated charge present on said charge generating

23        photosensitive device during a remaining part of said period  
24        of time wherein a second image is defined; and  
25                generating a difference between (i) said generated  
26        charge associated with said first part of said period of time  
27        and (ii) said generated charge associated with said remaining  
28        part of said period of time.

1        2. A method according to claim 1 wherein said first part of  
2        said period of time and said remaining part of said period of  
3        time are the same in duration.

1        3. A method according to claim 1 wherein said first part of  
2        said period of time and said remaining part of said period of  
3        time are different in duration.

1        4. A method according to claim 1 further comprising the step  
2        of applying, prior to said step of generating, a scaling  
3        factor to one of (i) said generated charge associated with  
4        said first part of said period of time and (ii) said  
5        generated charge associated with said remaining part of said  
6        period of time.

1        5. A method according to claim 2 further comprising the step  
2        of applying, prior to said step of generating, a scaling  
3        factor to one of (i) said generated charge associated with  
4        said first part of said period of time and (ii) said  
5        generated charge associated with said remaining part of said  
6        period of time.

1        6. A method according to claim 5 wherein said scaling factor  
2        has a value in the range of approximately 0.5 to 10.

1        7. A method according to claim 1 further comprising the step  
2        of draining said generated charge from said charge generating  
3        photosensitive device when said period of time terminates.

1        8. A method of generating a differential image of an object  
2        in a light scattering medium, comprising the steps of:

3            illuminating a portion of said light scattering medium  
4        with a single burst of illuminating light to generate  
5        reflected light therefrom;

6            providing a charge generating photosensitive device in  
7        the path of said reflected light;

8            activating said charge generating photosensitive device  
9        for a period of time during which a portion of said reflected  
10       light is collected by said charge generating photosensitive  
11       device in the form of a generated charge that is indicative  
12       of an image each instant of time during said period of time;

13           providing a first charge coupling device (CCD) and a  
14       second charge coupling device (CCD), each of which is  
15       independently operatively coupled to said charge generating  
16       photosensitive device by means of a first output line and a  
17       second output line, respectively;

18           simultaneously applying, during a first part of said  
19       period of time, a high potential to said first output line  
20       and a low potential to said second output line wherein said  
21       generated charge present on said charge generating  
22       photosensitive device during said first part of said period  
23       of time accumulates only on said first CCD and defines a  
24       first image;

25 simultaneously applying, during a remaining part of  
26 said period of time, a high potential to said secnd output  
27 line and a low potential to said first output line wherein  
28 said generated charge present on said charge generating  
29 photosensitive device during said remaining part of said  
30 period of time accumulates only on said second CCD and  
31 defines a second image; and

32 generating a difference between (i) said generated  
33 charge associated with said first part of said period of time  
34 and (ii) said generated charge associated with said remaining  
35 part of said period of time.

1 9. A method according to claim 8 wherein said first part of  
2 said period of time and said remaining part of said period of  
3 time are the same in duration.

1 10. A method according to claim 8 wherein said first part of  
2 said period of time and said remaining part of said period of  
3 time are different in duration.

1 11. A method according to claim 8 further comprising the  
2 step of applying, prior to said step of generating, a  
3 scaling factor to one of (i) said generated charge associated  
4 with said first part of said period of time and (ii) said  
5 generated charge associated with said remaining part of said  
6 period of time.

1 12. A method according to claim 9 further comprising the  
2 step of applying, prior to said step of generating, a  
3 scaling factor to one of (i) said generated charge associated  
4 with said first part of said period of time and (ii) said  
5 generated charge associated with said remaining part of said  
6 period of time.

1 13. A method according to claim 12 wherein said scaling  
2 factor has a value in the range of approximately 0.5 to 10.

1 14. A method according to claim 8 further comprising the  
2 steps of:

3 draining said generated charge from said charge  
4 generating photosensitive device immediately prior to the  
5 commencement of said period of time; and

6 draining said generated charge from said charge  
7 generating photosensitive device immediately after said

8 period of time terminates.

1 15. A system for generating a differential image of an  
2 object in a light scattering medium when a portion of said  
3 light scattering medium has been illuminated with a single  
4 burst of illuminating light to generate reflected light  
5 therefrom, said system comprising:

6 a charge generating photosensitive device placed in the  
7 path of said reflected light, wherein said charge generating  
8 photosensitive device is activated for a period of time during  
9 which a portion of said reflected light is collected by said  
10 charge generating photosensitive device in the form of a  
11 generated charge that is indicative of an image each instant  
12 of time during said period of time;

13 a first charge coupling device (CCD) independently  
14 operatively coupled to said charge generating photosensitive  
15 device by a first output line;

16 a second charge coupling device (CCD) independently  
17 operatively coupled to said charge generating photosensitive  
18 device by a second output line;

19 means for simultaneously applying, during a first part  
20 of said period of time, a high potential to said first output  
21 line and a low potential to said second output line wherein  
22 said generated charge present on said charge generating

23        photosensitive device during said first part of said period  
24        of time accumulates only on said first CCD and defines a  
25        first image;

26            means for simultaneously applying, during a remaining  
27        part of said period of time, a high potential to said second  
28        output line and a low potential to said first output line  
29        wherein said generated charge present on said charge  
30        generating photosensitive device during said remaining part  
31        of said period of time accumulates only on said second CCD  
32        and defines a second image; and

33            processing means for generating a difference between  
34        (i) said generated charge associated with said first part of  
35        said period of time and (ii) said generated charge associated  
36        with said remaining part of said period of time.

1        16.    A system as in claim 15 further comprising means,  
2        coupled to said charge generating photosensitive device, for  
3        draining said generated charge from said charge generating  
4        photosensitive device immediately prior to the commencement  
5        of said period of time, and for draining said generated  
6        charge from said charge generating photosensitive device  
7        immediately after said period of time terminates.

1        17.    A system as in claim 16 wherein said means for draining



2 comprises a drain line having a high potential applied  
3 thereto while each of said first output line and said second  
4 output line have a low potential applied thereto.